AR201110

CLL3H0914L(S)-700, 960 - 1215 MHz

v1.0 — 28th May 2020

AMPLEON

Application Report

Document information	
Status	Company Public
Author(s)	Hans Mollee
Abstract	Measurement results of a Class-AB design for the 960 - 1215 MHz band with the CLL3H0914L(S)-700

1. Revision History

Table 1: Report revisions

Revision	Date	Description	Author
1.0	20200519	Initial document	Hans Mollee

2. Contents

3. List of figures

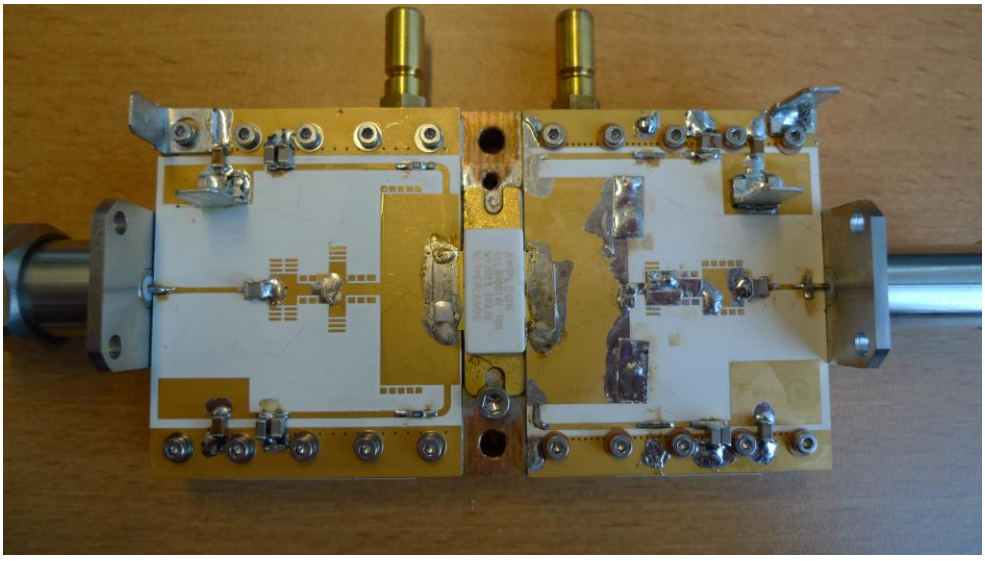
4. List of tables

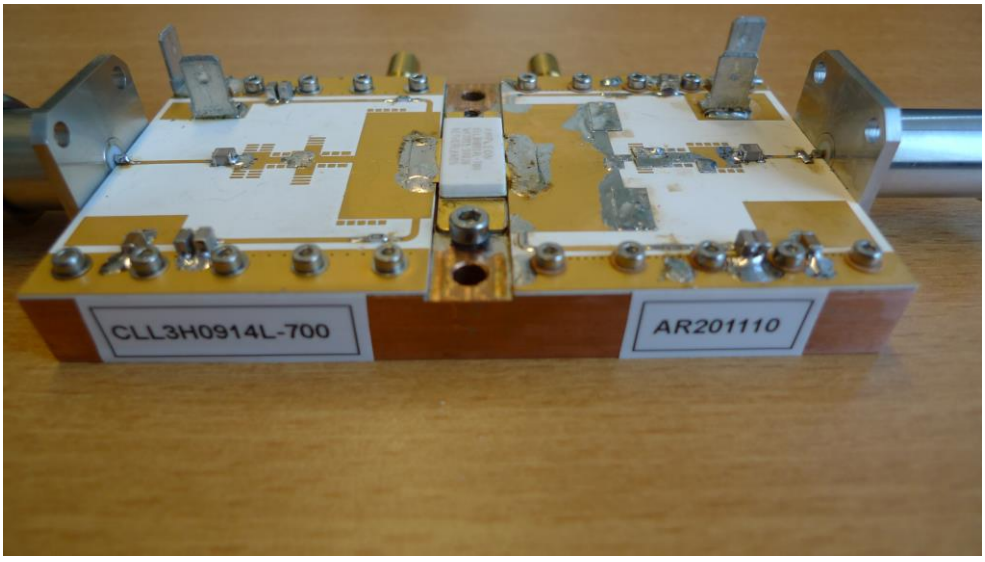
5. General description

This report presents the measurement results of the Class-AB demo AR201110. The device used is a CLL9H0914L(S)-700, 3RD generation GaN in a ceramic SOT502-package. The demo is designed for the frequency band 960 - 1215 MHz

The PCB has been designed on Rodgers RO4360G2, h=0.61mm, ε_R=6.15, 35um double sided copper.

Supply voltage (drain-source) is 52V to overcome voltage drop in the power supply in the measurement set-up. The actual drain supply however is 50V. The gate bias voltage is connected to the Vg terminals on the input board. To set the drain quiescent current, first apply -5V at the gate terminal before connecting the 50V drain voltage. Then slowly increase V_{GS} to approx. -2.9V at which point the I_{DQ} will be 100 mA.





6.1 Performance Details

The pulse format used is a 50 μs pulse with a duty cycle of 10%. The power sweep was performed up to 1.5 dB gain compression.

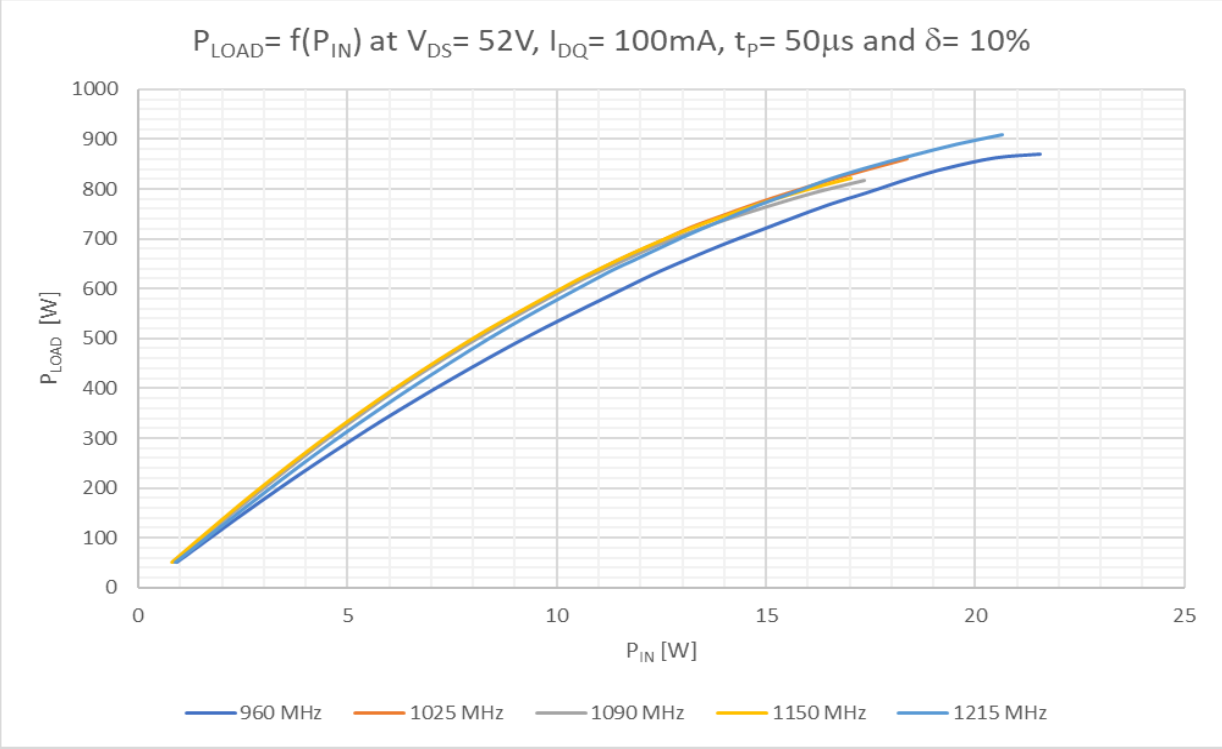


Figure 1 P_{LOAD} vs P_{IN}

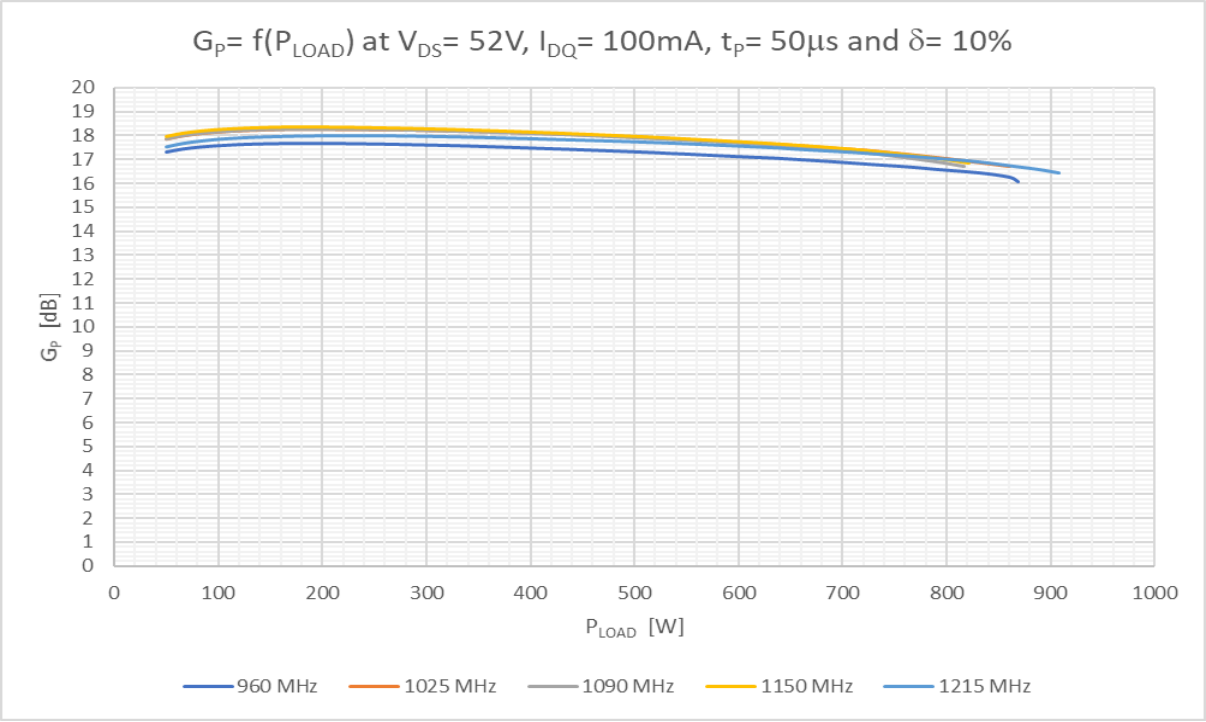


Figure 2 Gain vs P_{LOAD}

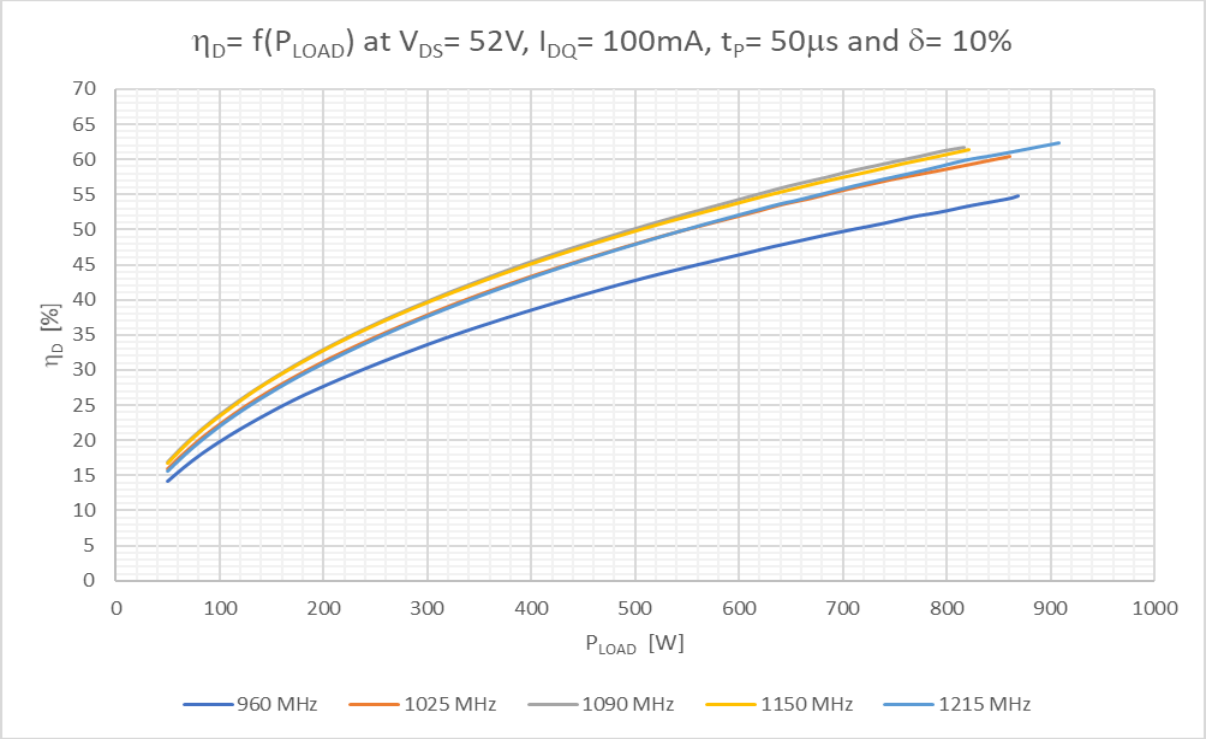


Figure 3 Drain efficiency vs P_{LOAD}

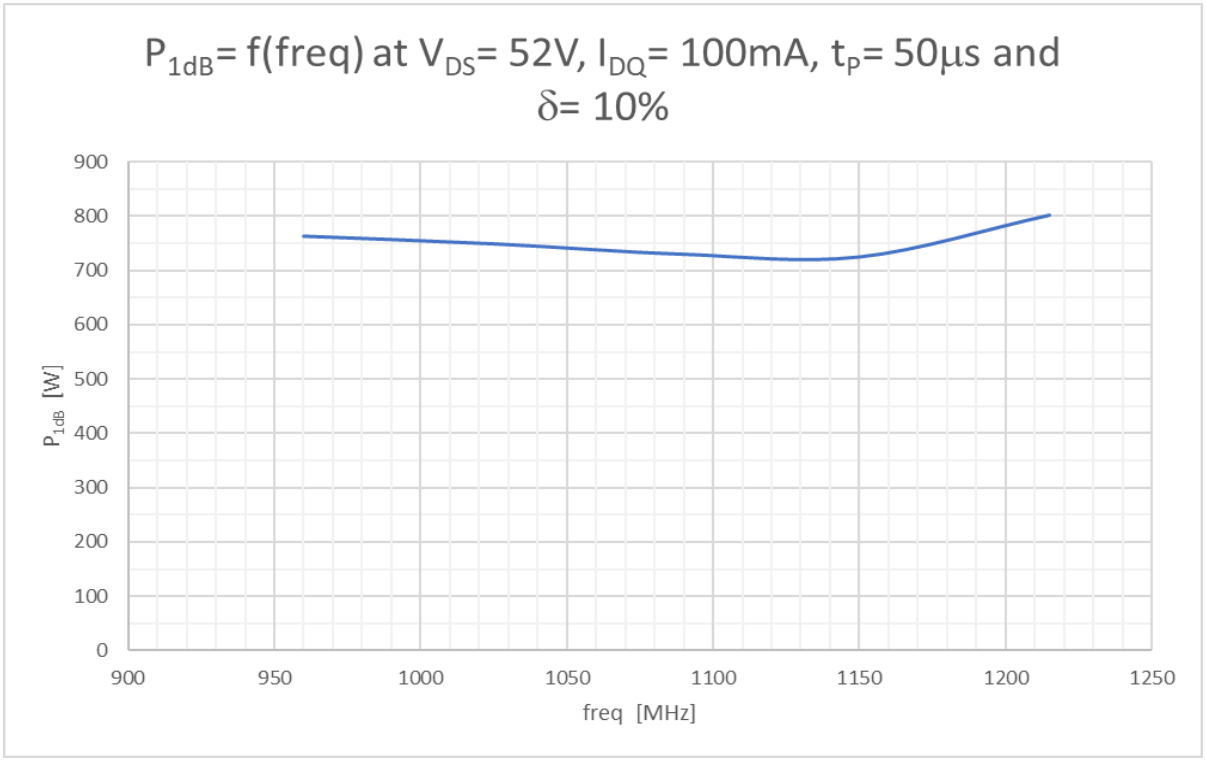


Figure 4 1dB Gain compression vs frequency

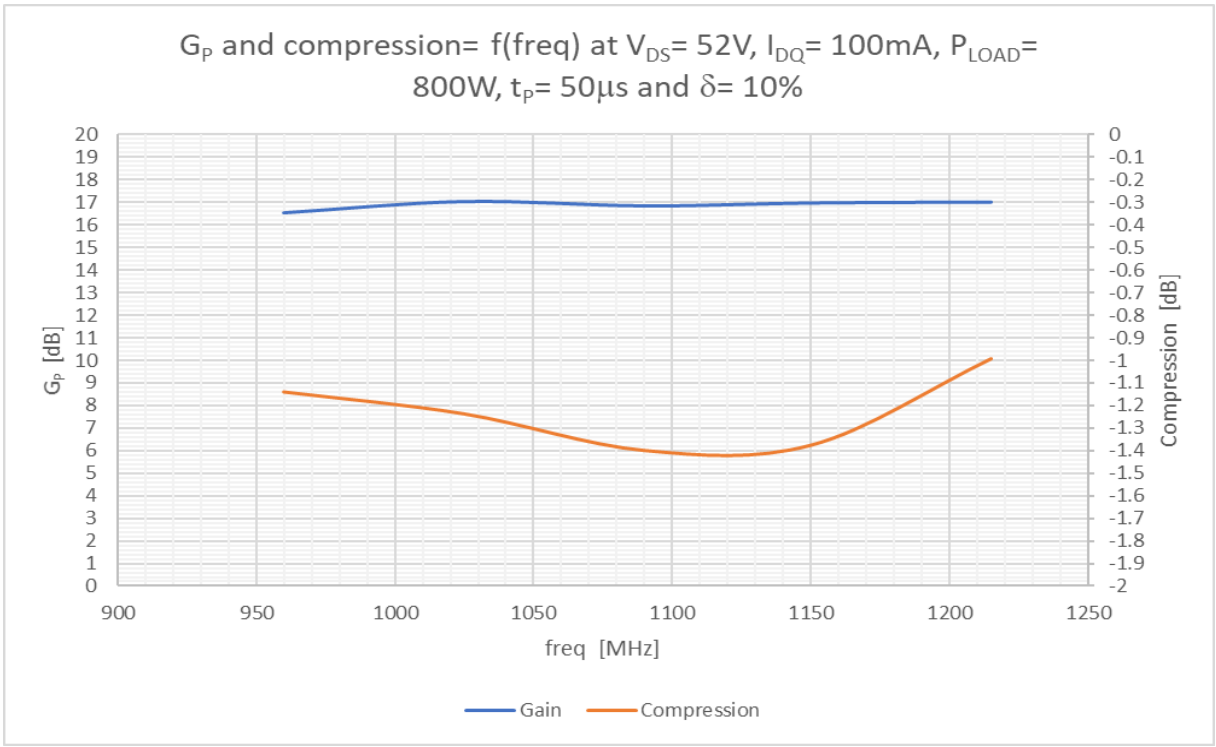


Figure 5 Gain and compression vs frequency

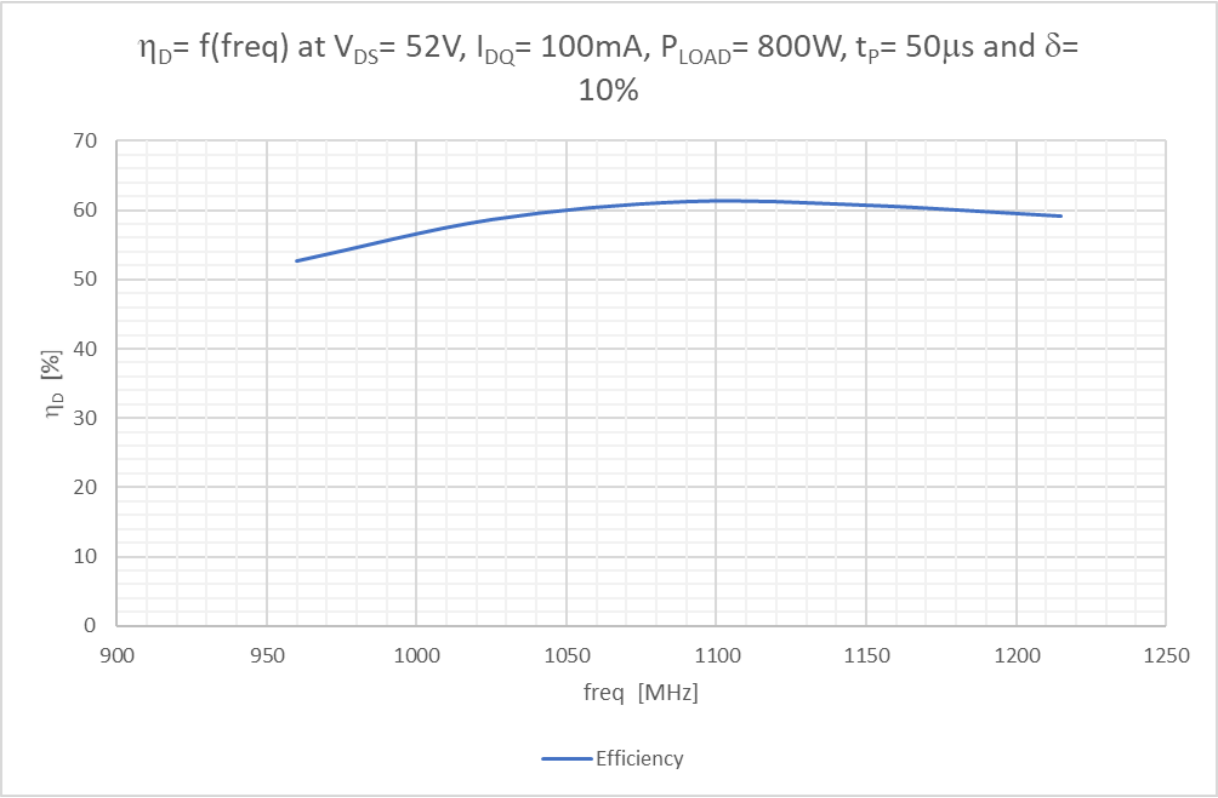
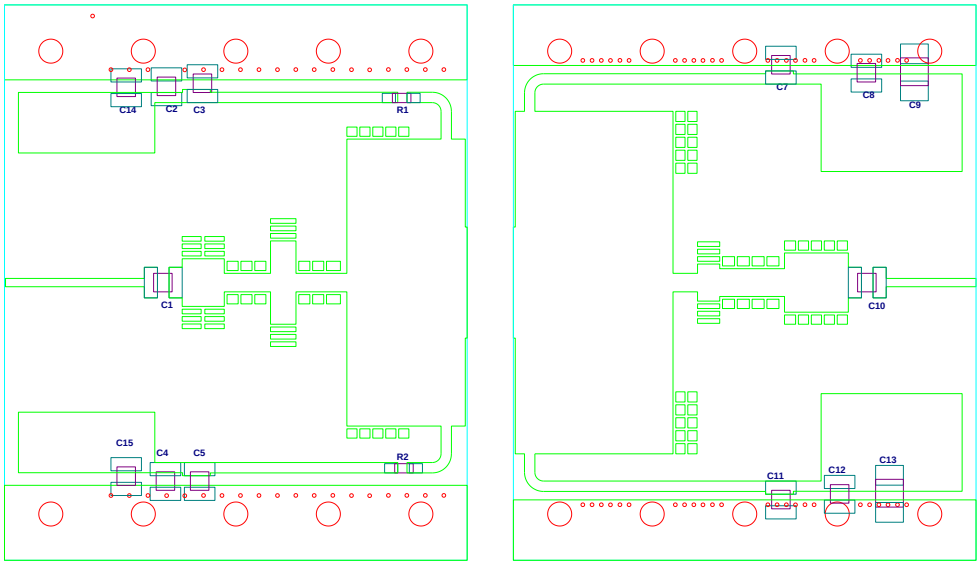


Figure 6 Efficiency vs frequency

Parameter	960 MHz	1025 MHz	1090 MHz	1150 MHz	1215 MHz
P_{1dB}	764	750	730	725	802
Compression at 600 W	0.56	0.56	0.57	0.63	0.40
Compression at 800 W	1.13	1.23	1.39	1.37	1.00
G_P at P_{1dB}	16.7	17.2	17.2	17.3	17.0
η_D at P_{1dB}	51.9	57.8	59.1	58.5	59.9

Table 1: Performance summary

7 Hardware



Components list application circuit.		
C1, C3, C5, C7, C10, C11	430 pF	ATC800B
C2, C4, C8, C12	1 nF	ATC100B
C9, C13, C14, C15	4.7 μF – 100V	GMR42 258K7S 475K 100 H53
R1, R2	10 Ω	0603 SMD Resistor

PCB Material: Rogers 4360G2, thickness 0.61 mm (24 mil) or equivalent, ε_R = 6.15, Cu = 35 micron

Table 2: Board specifications

Parameter	Value
Manufacturer	Rogers
Type	RO4360G
Thickness	24 mil, 0.61 mm
Layers	2, top/bottom. Bottom all copper

Table 3: Device specifics

Parameter	Value
Manufacturer	Ampleon
Device	CLL3H0914L-700
Marking	CLL3H0914L-700, wk2011-10836
Comments	Engineering sample

6. Legal information

6.1 Definitions

Draft — The document is a draft version only. The content is still under internal review and subject to formal approval, which may result in modifications or additions. Ampleon does not give any representations or warranties as to the accuracy or completeness of information included herein and shall have no liability for the consequences of use of such information.

6.2 Disclaimers

Limited warranty and liability — Information in this document is believed to be accurate and reliable. However, Ampleon does not give any representations or warranties, expressed or implied, as to the accuracy or completeness of such information and shall have no liability for the consequences of use of such information. Ampleon takes no responsibility for the content in this document if provided by an information source outside of Ampleon.

In no event shall Ampleon be liable for any indirect, incidental, punitive, special or consequential damages (including - without limitation - lost profits, lost savings, business interruption, costs related to the removal or replacement of any products or rework charges) whether or not such damages are based on tort (including negligence), warranty, breach of contract or any other legal theory.

Notwithstanding any damages that customer might incur for any reason whatsoever, Amplicon's aggregate and cumulative liability towards customer for the products described herein shall be limited in accordance with the Terms and conditions of commercial sale of Ampleon.

Right to make changes — Ampleon reserves the right to make changes to information published in this document, including without limitation specifications and product descriptions, at any time and without notice. This document supersedes and replaces all information supplied prior to the publication hereof.

Suitability for use — Ampleon products are not designed, authorized or warranted to be suitable for use in life support, life-critical or safety-critical systems or equipment, nor in applications where failure or malfunction of an Ampleon product can reasonably be expected to result in personal injury, death or severe property or environmental damage. Ampleon and its suppliers accepts no liability for inclusion and/or use of Ampleon products in such equipment or applications and therefore such inclusion and/or use is at the customer's own risk.

Applications — Applications that are described herein for any of these products are for illustrative purposes only. Ampleon makes no representation or warranty that such applications will be suitable for the specified use without further testing or modification.

Customers are responsible for the design and operation of their applications and products using Ampleon products, and Ampleon accepts no liability for any assistance with applications or customer product design. It is customer's sole responsibility to determine whether the Ampleon product is suitable and fit for the customer's applications and products planned, as well as for the planned application and use of customer's third-party customer(s). Customers should provide appropriate design and operating safeguards to minimize the risks associated with their applications and products.

Ampleon does not accept any liability related to any default, damage, costs or problem which is based on any weakness or default in the customer's applications or products, or the application or use by customer's third-party customer(s). Customer is responsible for doing all necessary testing for the customer's applications and products using Ampleon products in order to avoid a default of the applications and the products or of the application or use by customer's third-party customer(s). Ampleon does not accept any liability in this respect.

Export control — This document as well as the item(s) described herein may be subject to export control regulations. Export might require a prior authorization from competent authorities.

6.3 Trademarks

Notice: All referenced brands, product names, service names and trademarks are the property of their respective owners.

Any reference or use of any 'NXP' trademark in this document or in or on the surface of Ampleon products does not result in any claim, liability or entitlement vis-à-vis the owner of this trademark. Ampleon is no longer part of the NXP group of companies and any reference to or use of the 'NXP' trademarks will be replaced by reference to or use of Amplicon's own trademarks.

6.4 Contact information

For more information, please visit: http://www.ampleon.com

For sales office addresses, please visit: http://www.ampleon.com/sales